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UNIVERSITY OF ALBERTA

HEALTH PROFESSIONALS AND KNOWLEDGE OF HEARING LOSS IN ACUTE CARE AND EXTENDED CARE

LYNN M. BUTLER

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN

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FOR THE DEGREE OF

MASTER OF EDUCATION

IN

SPECIAL EDUCATION–HEARING IMPAIRED

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

SPRING 1992

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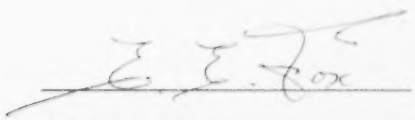
The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled HEALTH PROFESSIONALS AND KNOWLEDGE OF HEARING LOSS IN ACUTE CARE AND EXTENDED CARE submitted by Lynn M. Butler in partial fulfillment for the degree of MASTER OF EDUCATION in SPECIAL EDUCATION -- HEARING IMPAIRED.



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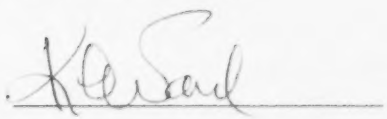

Dr. K. Ward

Date: March 25, 1992

DEDICATION

This thesis is dedicated to my husband, Timothy,
for his love, unending encouragement, and support
for this and all of my endeavours.
Also to my parents, Henry and Carmel O'Reilly,
for their recognition of the value of higher education
and their support in helping their nine children pursue such education.

Abstract

Studies conducted in the area of professionals' knowledge of hearing impairments have revealed knowledge deficits regarding hearing health information (Singer & Brownell, 1984). The present investigation had two aims. One was to assess the extent of health professionals' knowledge of hearing loss in an active treatment hospital and an extended care facility. The second aim was to evaluate the effect in-servicing of professionals had on awareness of hearing impairments. Communication difficulty can increase patient anxiety, interfere with the speed and accuracy of diagnosis, and threaten the effectiveness of rehabilitation. Both deaf and hard of hearing individuals can be hospitalized patients in an active treatment or extended care setting. A two group pretest-posttest research design was used in the investigation. An inventory which included demographic and knowledge subsections was administered to 64 health professionals, 30 health professionals from an active treatment facility and 34 health professional from an extended care facility, followed by a 25 minute in-service session. Part two of the Hearing Health Inventory, including only the knowledge subsections, was post-administered to the participants at least ten days after the in-service session. Results indicated that in-servicing of health professionals is an effective means of increasing knowledge of hearing loss and the effects of hearing loss on communication. An in-service program was designed to heighten awareness of general knowledge related to hearing impairments, and to help health professionals develop effective communication technique when interacting with deaf and hard of hearing individuals.

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CHAPTER ONE
INTRODUCTION

The purpose of the present investigation was to examine the extent of hearing health knowledge of health professionals who were employed in either an active treatment setting or an extended care setting in a western Canadian province and to determine if an in-service session on hearing impairment would have an effect on awareness of hearing loss. The participants in the first group were employed in an active treatment setting, serving a population of patients of all ages. The participants in the second group were employed in an extended care setting, serving a population of patients, the majority of whom are elderly. The background and rationale of the investigation, objectives of the investigation, terminology, and an overview are presented in this chapter.

Background and Rationale for the Study

Hearing loss, sufficiently severe to interfere with communication can be present in individuals of any age.The incidence of hearing loss in the general population is seven percent (Feller, 1977: Statistics Canada, 1983). A large percentage of the people in the deaf and hard of hearing population are in the 18-65 age group (Pebergy, Eastmen, Pichora-Fuller, Reesor, & Alberti, 1984). Members of either group can be hospitalized patients in an active treatment hospital.

The hard of hearing population make up the majority of the hearing impaired population. It is among the elderly that hearing loss is most frequently found. Elderly individuals are more likely to be hospitalized and live in extended care facilities. Thus, hearing health knowledge, which is of importance to all health care workers, is of even greater significance for those who work in extended care settings.

It has been estimated that eight percent of the American population and six percent of the Canadian privilege population experience hearing loss (Feller, 1977; Statistics Canada, 1983). A marked increase in the elderly population in Canada and the United States has been forecasted by demographers (Smith & Faye, 1977; Pebergy et al., 1984; Corso, 1984). Population projections for Canada show an increase in this population from 9.7% in 1981 to 16.6% by the year 2021 (Roadberg, 1985). Projections for the American population forecast an increase in the elderly population from the present 11% to 15.5% by the year 2020 (Kline, Sekuler, & Dismukes, 1982). This part of the population represents a sizable portion of the hearing impaired population, 34.2% for Canada, and 43% for the United States (Zegeer,1986; Jacobs-Condit, 1984). Frequently, the elderly experience presbycusis, a condition involving difficulty hearing high pitched sounds which makes speech difficult to understand (Zegeer, 1986). An estimated five percent of the elderly population live in extended care facilities (Hull, 1980) and percentages ranging from 92 to 100% of this specific population exhibit hearing loss to some degree (Schow & Nerbonne, 1980; Sommers, Weidner & McAleer, 1982; Bingea, Raffin, Aune, Baye, & Shea, 1982). Therefore, individuals with hearing impairments are likely to be present in greater numbers in extended care settings than in acute care hospitals.

A variety of assessment techniques have been developed to measure the hearing handicaps and audiological needs of the elderly population (Weinstein, 1986; Ventry & Weinsein, 1983). Programs have been designed to address personal adjustment to acquired hearing loss, (Peberdy et al. 1984; Pellegrino & Nilo, 1987; Kaplan, 1983) and focus has been given to audiological rehabilitation for the elderly (Smith & Fay, 1977; Klettner, 1981; Rupp, 1983; Miller, 1986.) While it is essential that the audiological needs of the hearing impaired elderly be addressed, it is crucial that health professionals who serve this population be informed and educated about the effects of hearing impairment. While health professionals serving exclusively

elderly individuals have greatest need for information concerning hearing impairments, workers in any health care facility can come into contact with deaf and hard of hearing individuals of any age.

Researchers recommend in-servicing of professionals working with deaf and hard of hearing individuals (Lass, Carlin, Woodford, Campanelli-Humpreys, Hushion-Stemple, & Boggs, 1986; Singer et al., 1984) as it is seen as a beneficial tool for increasing the efficiency and effectiveness of their professional services (Lass et al., 1986). Health professionals' need to be more informed about the psychological and social impact hearing difficulties present to patients. Therefore, the rationale for this research was to investigate present knowledge of hearing loss and to contribute information on this topic. A major goal was to increase awareness of patients' needs.

Terminology

Following are definitions of terminology used in the present study.

Hearing Impairment

The term *hearing impairment* is a general one, defined as a loss of hearing severe enough to produce disorders of communication (Rodda & Grove, 1987). It is as much a sociological phenomenon as an audiological definition (Rodda & Grove, 1987; Schein, 1987). As an audiological definition, *hearing impaired* refers to the entire range of auditory difficulties experienced by deaf and hard of hearing individuals. The term *hearing impairment* refers to a continuum of hearing difficulties, more severe to profound losses (70 dB and greater) experienced by the deaf individual, and mild to moderate losses (25 dB to 69 dB), experienced by the hard of hearing person.The term *hearing impairment* will be used sparingly here in as both of these consumer groups no longer agree to the use of this term.

Deaf/Deafness

The term *deaf/deafness*, audiologically defined, refers to a hearing threshold level greater than 70 dB. The average threshold equals the means of the pure tone thresholds obtained at 500 , 1000, and 2000 Hz. The term *deaf,* when referring to an individual, is defined as "one whose hearing is disabled to an extent (usually 70 dB ISO or greater) that precludes the understanding of speech through the ear alone, with or without the use of a hearing aid" (Moores, 1982, p. 6).

Hard of Hearing

The term *hard of hearing*, when referring to an individual, is defined as "one whose hearing is disabled to an extent (usually 35 to 69 dB ISO) that makes difficult without precluding the understanding of speech through the ear alone, with or without the use of a hearing aid" (Moores, 1982, p. 6).

Objectives

The study was based upon two specific objectives. First, the objective was to compare health professionals' knowledge of hearing loss in two different settings, an active treatment hospital and an extended care facility. Second, the objective was to evaluate the effects of exposure to an in-service session providing information related to hearing loss. In addition, an in-service presentation was designed as a means of contributing information about hearing impairments to professionals serving the deaf and hard of hearing population.

Overview

An introduction to the problem, comprised of general background information and rationale, terminology, and objectives is presented in this chapter.

The issue of health professionals' knowledge of hearing loss is extended in the review of relevant literature covered in Chapter II. This review commences with a

discussion of demographic trends. The review centers on the etiology of hearing loss in general and acquired hearing loss specifically. Attention has been given to the psychological and social impact of hearing loss. Also the review focuses on professionals' knowledge of hearing impairment and the need for further education on this subject. The chapter closes with a statement of the hypotheses.

Chapter III gives an overview of the methodology used to conduct the present research, providing information pertaining to subjects, assessment, instrument, data collection, and data analysis.

Chapter IV provides a discussion of analysis and results of data. Chapter V includes limitations and implications of the research and suggestions for further research.

CHAPTER TWO
LITERATURE REVIEW

Introduction

The intent of the author of the present study was to increase understanding of information pertaining to hearing health as a means of promoting good health, and effective communication between health professionals and their patients. Another purpose was to examine the effect of presenting an in-service session on the topic of hearing impairments to health professionals. This hypothesis suggests that there would be an increase of knowledge in the area.

The literature review begins with a discussion of demographics concerning deaf and hard of hearing individuals. Demographic trends for the hard of hearing population in general as well as the aging population with acquired hearing loss specifically are outlined. Literature pertaining to professionals' knowledge of hearing health is presented. Relevant literature on the etiology of hearing loss is reviewed. The psychological and social impact of hearing impairments are discussed, focusing on denial, frustration, confusion, social isolation, and communication difficulties. Finally, a discussion regarding in-servicing of health professionals and information about hearing health recommended to be implemented in educational programs is included.

Demographics

Demographers estimate that 16 million Americans (Feller, 1977) and 1.5 million Canadians (Statistics Canada,1983) experience hearing loss. Individuals of all ages experience hearing problems that interfere with communication.

Demographers have predicted large increases in the elderly portion of the population. Eleven percent of the American population is now sixty five years of age or older. Projections for the year 2020, forecast an increase in the sixty five years or older

category to 15.5% (Kline, Sekuler, & Dismukes, 1982). Population projections for Canada show a similar increase. In 1981, the median age in Canada was 29.5 years and by the year 2021 a median age of 40.5 years is forecast, predicting half of Canada's population to be over 40 years of age at that time (Roadberg, 1985). Over the same period of time, the proportion of the Canadian population aged sixty five and over will increase from 9.7% to 16.6%.

In 1982, Americans, aged sixty five years and older, represented 12% of the United States population and 43% of the hearing impaired population (Jacobs-Condit, 1984). Similarly, Canadians, aged 65 and older in the year 1978, represented 8.8% of the Canadian population and 34.2% of the hearing impaired population.

Many individuals in this elderly population will have sensory alterations associated with aging, specifically, hearing alterations (Zegeer, 1986). In 1979, twenty eight percent of the American population, aged 65 or older, had hearing impairments. In the elderly population, aged 75 or older this figure increased to 38 percent (Zegeer, 1986). Twenty three percent of the hearing impaired aged population have conductive presbycusis, involving difficulty with low pitched sounds. Frequently found is the occurrence of sensorineural presbycusis, involving difficulty with high pitched sounds and eventually a decline in low pitched sounds as well (Zegeer, 1986).

More than five percent, or approximately 1.2 million, of the geriatric population live in health care facilities (Hull, 1980a) and extremely high percentages of this population have been determined to exhibit hearing alterations when tested using pure tone audiometric studies (Schow & Nerbonne, 1980; Sommers, Weidner, & McAleer, 1982). The incidence and severity of hearing loss among geriatric residents of nursing homes was studied by Bingea, Raffin, Aune, Baye, and Shea (1982) indicating that six percent of the elderly patients exhibited normal hearing threshold level, 11% exhibited mild losses, 13% had a moderate loss and 35% had a severe to profound loss. Ninety

six percent of elderly nursing home residents have been found to be hearing impaired. (Soucek, Michaels, & Frolich,1986).

Given these demographic trends toward an aging population, a rise in the incidence of hearing loss in the general population can be expected. The implications of such demographic trends for health professionals, is an increase in individuals requiring assistance from professionals knowledgeable about prevention, identification and effective management of individuals experiencing hearing loss.

Knowledge

A basic understanding of pertinent information regarding hearing health can potentially increase effective communication between service provider and client, help develop self care skills, and promote good health practices (Lass et al., 1986; Singer & Brownell, 1984). As indicated by population trends, the number of clients with hearing impairments will increase dramatically in the near future. Knowledgeable professionals are required to meet the needs of such a population.

Researchers have explored professionals' knowledge of and exposure to hearing loss information (Lass et al., 1986) and have reported a deficiency in knowledge regarding hearing loss and minimal exposure to hearing loss information. Ideally, professionals will increase their educator role by counselling the deaf or hard of hearing individual, along with their families and communities, to improve self-care skills, coping skills, and their environment (Epp, 1987). A study assessing hearing health knowledge of the general public revealed knowledge deficits regarding hearing aid information, communication with hearing impaired individuals, and the effects of drugs and disease on hearing (Singer & Brownell, 1984).

Etiology

von Leden (1977) describes hearing loss as a symptom of physiologic changes in the ear and its connections to the central nervous system. Hearing impairment may be the result of ototoxic drugs, disease, genetic or environmental factors. The impact on the individual will depend on age of onset, nature and degree of loss (Watts & Pegg, 1977; Rodda & Grove, 1987; Paparella, 1984; Martin, 1975; Fitzgerald,1985).

Several authors define and construct definitions of hearing impairment in the adult population. Presbycusis can be defined as a degeneration of the auditory system that occurs in some persons with advancing age. Presbycusis occurs predominantly in the central pathways and is characterized by a progressive bilateral loss of hearing due to degenerative physiological changes in the auditory system (Peberdy et al., 1984; Rupp, 1983; Corso, 1984; Belal & Glorig, 1987; Miller, 1986; Rousseau, 1987; Mader, 1984).

Four forms of the condition have been identified, neural presbycusis, involving a loss of neurons in the central nervous system; sensory presbycusis,involving degeneration of the organ of Corti; metabolic presbycusis, produced by atrophy of the stria vascularis; and mechanical presbycusis resulting from a disorder of the motion of the mechanics of the cochlea duct, caused by a stiffening of the basilar membrane (Miller, 1986; Katsarkas & Ayukawa, 1986; Olsen, 1984; Bonfils, Bertrand, & Uzeil, 1988). Each of these forms present differing audiological conditions and require specific audiological rehabilitation (Miller, 1986).

Presbycusis is a progressive condition caused by both intrinsic and extrinsic factors. Intrinsic, such as genetic predisposition or extrinsic, such as noise exposure. Clinical conditions such as cardiovascular difficulties or diabetes are considered to be contributing factors to the occurrence of presbycusis (Katsarkas & Ayukawa, 1986).

Psychosocial Impact

The term hearing impairment refers to a deviation from normal hearing as tested using pure tone audiometry. However hearing loss can have considerable communication, psychological, and social consequences.

Several authors recognize that the implication of auditory deficits cannot be isolated from the person's complete repertoire of behavior (Corso, 1984; Lipkin & Williams, 1986; Miller, 1986; Mader, 1984; Oppegard, Hansson, Morgan, Indart, Crutcher, & Hampton, 1984). Constraints on communication due to hearing loss involve difficulty with the complex processes of receiving, storing, interpreting, and retrieving information. This difficulty with communication is seen as a barrier in pursuing and maintaining interpersonal relationships and participation in social events (Corso, 1984; Zegeer, 1986; von Leden, 1977; Lipkin & Williams, 1986; Olsen, 1984).

Psychosocial considerations should be given equal consideration to technical factors regarding intervention with deaf and hard of hearing persons. It is recommended by several authors (Corso, 1984; Miller, 1986; Mader, 1984) that individuals with hearing problems should have access to audiological and medical services as a means of receiving appropriate assessment and management. Further recommended is adequate aural rehabilitation focusing on social and psychological factors (Lipkin & Williams, 1986; Smith & Faye, 1977; Peberdy et al., 1984; Cleaver, 1987).

Denial is often the initial reaction to a hearing deficit. Individuals with mild to moderate hearing losses often experience a near miss in communication. The frustration caused by this can highly motivate a person to deny the loss. (Conway-McDavis, 1983; Lipkin & Williams, 1986).

Personal isolation often leads to other subjective feelings including fear, confusion, embarrassment, depression, insecurity and generalized suspiciousness

(Miller, 1986; Mader, 1984; Oppegard et al., 1984; Conway-McDavis, 1983; Franks & Beckmann, 1985).

Social isolation caused by the inability to communicate with others as a result of a hearing loss can be the most devastating (Miller, 1986; Mader, 1984). Researchers have expressed concern regarding the difficulty elderly people may experience with functional and social isolation as a result of an acquired hearing loss (Miller, 1986; Mader, 1984). Social isolation can be a result of ineffective participation in communicating with family members and friends, and interference in ease of participation in recreational activities (Miller, 1986).

Many studies have been focused upon social isolation and the need for social support for the elderly patient (Oppegard et al., 1984; Rupp, 1983; Corso, 1984; Miller, 1986; Hawryluk, 1987). An acquired hearing loss increases the isolation that is frequently experienced in the aged, thus intensifying the need for more scientifically precise rehabilitation of persons experiencing hearing loss (Soucek, Micheals, & Frihlich, 1986). Zegeer (1986) states that as we age the integrity of our senses are threatened and we become more dependent, insecure, and deprived of quality life if we are unable to effectively adapt.

Lifestyle and perceived handicap are factors which impact the individual in terms of hearing loss (Watt & Pegg, 1977). Individuals often make substantial adjustment in lifestyle, and interpersonal relationships. With technological advances and further education of professionals and the general public, the future promises more assistance and understanding for the hard of hearing and deaf population.

Education

Hearing impairment can cause a communication barrier for the patient and the people involved in their lives (Oppegard et al., 1984; Rupp, 1983;

Corso, 1984; Miller, 1986; Hawryluk, 1987; Conway-McDavis, 1983; Franks et al., 1985; Root, 1987). A better understanding of the nature of the problem is desired.

Various programs have been designed in an attempt to deal with the concerns of patients in the hospital setting (Smith & Faye, 1977; Pebergy et al., 1984; Cleaver, 1987). The programs focus on auditory rehabilitation (Smith & Faye, 1977; Peberdy et al., 1984; Cleaver, 1987), information about the needs of the adult with an acquired hearing loss (Peberdy et al., 1984), education for the elderly (Kaplan, 1983), and education for medical staff (Peberdy et al., 1984). Recommendations for dealing with the hard of hearing elderly have been suggested (Peberdy et al., 1984). Technical concerns have been addressed in design and planning of hospitals for the sensory impaired (Klettner, 1981).

In-service

Health professionals who serve the deaf and hard of hearing population should be informed and educated about the effects of hearing impairment. Researchers recommend in-servicing of professionals working with the hearing impaired population (Lass et al., 1986; Singer & Brownell, 1984) as a means of increasing the efficiency and effectiveness of their professional services. The psychosocial impact of hearing loss can be lessened considerably by increasing health professionals' awareness of various helpful measures (Lipkin & Williams, 1986).

An increase in the elderly population and, therefore, in the hearing impaired population warrants the need for expanding knowledge in the area on hearing loss (Kline, Sekuler, & Dismukes, 1982; Roadberg, 1985; Jacobs-Condit, 1984). In-services need to provide adequate information relating to hearing health. Information on etiological factors, communication techniques, technical information, psychosocial factors, hearing loss prevention, and environmental issues are recommended as

content pertinent to such a presentation (Corso, 1984; Zegeer, 1986; Cleaver, 1987, von Leden, 1977; Lipkin & Williams, 1986).

Corso (1984) suggests that etiological factors need to be addressed including diet, ototoxic drugs, hormones, and genetic mechanisms. The authors of several studies explain that the central concern for staff members and patients in hospital settings is difficulty with communication (Smith & Faye, 1977; Zegeer, 1986; Magilvy, 1985). Education about proper communication techniques and potential problems resulting from hearing loss need to be provided to all professionals providing services to patients (Zegeer, 1986, von Leden, 1977; Lipkin & Williams, 1986; Olsen, 1984). Various sources list strategies for dealing with the dilemma of communication facilitation for the patient population (Smith & Faye, 1977; Zegeer, 1986; Magilvy, 1985; Conway-McDavis, 1983; Franks et al., 1985).

Technological information regarding testing, assistive listening devices and rehabilitation techniques should be included in in-service sessions as a means of improving management of the audiological needs (Cleaver, 1987; von Leden, 1977; Miller, 1986; Mader, 1984; Olsen, 1984).

Current information about psychological and social needs should be provided to professionals so they can contribute better care to deaf and hard of hearing patients (Miller, 1986; Mader, 1984; Oppegard et al., 1984; Conway-McDavis, 1983; Franks & Beckmann, 1985). Prevention of hearing loss and accessibility to effective communication through acoustically appropriate environments are also recommended topics for in-servicing in this area. An in-service was designed for health professionals using these references.

Summary

Demographic trends indicate an inevitable increase in the hearing impaired population due to an increase in the aging population. Information about these trends

can be used to indicate a need for knowledgeable professionals working in service providing professions. The focus of this research study was to increase knowledge in the area of hearing health. From the literature review, it was estimated that more information is needed by professionals in this particular area. The topic of presbycusis was examined to help provide information on the most prevalent hearing difficulty faced by the hard of hearing population. Psychosocial information was reviewed and presented to establish an understanding of the personal impact of hearing loss. Knowledge and awareness of hearing impairment can promote better care for the patient and can help with initial assessment and continued communication. From the literature review, it was ascertained that five main areas that should be addressed. These areas are as follows: etiology, communication, auditory technology, psychosocial impact, and hearing health care. This information was integrated into the in-service design.

Given that 96% of patients in extended care facilities experience hearing difficulty (Schow & Nerbonne, 1980; Sommers et al., 1982), it is apparent that health professionals in this setting have regular exposure to individuals with hearing loss. It is proposed that health professionals working in this setting will be more knowledgeable about hearing loss than their colleagues working in acute care settings. It is further proposed that in-servicing of professionals is an appropriate means of increasing knowledge in the area of hearing health.

Arising from the reviewed literature are two contentions or hypotheses...

Hypothesis I.

Professionals working in an extended care facility will be more informed about hearing loss than professionals working in an active treatment hospital.

Hypothesis II.

Health professionals' knowledge of hearing impairments will be increased by exposure to an in-service training session.

CHAPTER THREE
METHODOLOGY

Subjects

A total sample of 64 health professionals was obtained from the health professionals employed in three medical institutions located in a western Canadian province. The three institutions consisted of one active treatment facility and two extended care facilities.

Subject Criteria

Subjects were required to meet two criteria (a) to be working in either an active treatment facility or an extended care facility, and (b) to have working contact with patients in one of the previously mentioned facilities.

Subject Grouping

Subjects were divided into two groups determined by their work setting. Group I consisted of those health professionals from an active treatment facility and Group II consisted of those health professionals from an extended care facility.

Initially, Group I consisted of 33 participants and Group II consisted of 42 participants. However, three participants from Group I were excluded because of their participation in the pretest only. Eight participants from Group II were excluded because of their participation in the pretest only. Thus, 64 subjects were included in the study with thirty subjects in Group I and thirty four subjects in Group II. Individual characteristics of health professionals in Group I and in Group II are summarized in Table 1 and Table 2 respectively. Group comparisons of subject characteristics pertaining to gender, age, occupation, and years of service are provided in Table 3.

TABLE 1
Individual Characteristics of Group I Health Professionals (Active Treatment Facility)

Subject	Gender	Age	Occupation	Years of Service
1	F	30	Dietary Aide	7
2	F	44	X-Ray Technologist	1.5
3	F	37	Physiotherapist	15
4	F	24	Laboratory Technologist	2
5	F	30	Registered Nurse	2
6	F	43	Registered Nurse	13
7	F	45	Laboratory Technologist	24
8	F	44	Radiation Technologist	23
9	F	38	Dietitian	11
10	F	37	Licensed Practical Nurse	19
11	F	47	Registered Nurse	6
12	F	42	Licensed Practical Nurse	22
13	F	41	Registered Nurse	16
14	F	40	Registered Nurse	20
15	F	48	Registered Nurse	26
16	F	50	Nursing Attendant	20
17	F	30	Registered Nurse	5
18	F	46	Registered Nurse	8
19	F	26	Registered Nurse	2.5
20	F	55	Registered Nurse	30
21	F	41	Administration Nurse	20
22	F	39	Registered Nurse	0.5
23	F	50	Registered Nurse	20
24	F	33	Housekeeper	4 days
25	F	46	Housekeeper	2
26	F	36	Housekeeper	3.5
27	F	57	Housekeeper	24
28	F	50	Housekeeper	15
29	F	32	Cook	5
30	F	20	Nursing Student	0

TABLE 2
Individual Characteristics of Group II Health Professionals (Extended Care Facility)

Subject	Gender	Age	Occupation	Years of Service
1	F	30	Registered Nurse	10
2	F	20	Auxiliary Care Worker	1
3	F	56	Registered Nurse	35
4	F	41	Nursing Attendant	0
5	F	31	Licensed Practical Nurse	10
6	F	37	Pharmacist	10
7	F	46	Licensed Practical Nurse	20
8	F	44	Licensed Practical Nurse	20
9	F	25	Licensed Practical Nurse	5
10	F	34	Occupational Therapist	5
11	F	35	Registered Nurse	12
12	F	27	Licensed Practical Nurse	5
13	F	44	Registered Nurse	22
14	M	22	Nursing Attendant	1.5
15	F	34	Nursing Attendant	2
16	F	48	Administration Staff	1
17	F	40	Nursing Attendant	20
18	F	39	Registered Nurse	17
19	F	59	Licensed Practical Nurse	18
20	F	23	Volunteer	1
21	F	34	Pharmacist	10
22	F	22	Pharmacy Intern	0
23	F	53	Licensed Practical Nurse	11
24	F	56	Physical Therapist	7
25	F	48	Registered Nurse	25
26	F	24	Occupational Therapist	3
27	F	41	Licensed Practical Nurse	14
28	F	43	Licensed Practical Nurse	3
29	F	41	Laboratory Assistant	9
30	F	29	Pharmacist	6
31	M	59	Chaplain	31
32	F	42	Dietitian	7
33	F	54	Housekeeper	12
34	F	42	Licensed Practical Nurse	23

TABLE 3

Comparison of Characteristics by Group

Characteristics/ Means	Group I	Group II
Number of Subjects	30	34
Male	0	2
Female	30	32
Age Range	20-57	20-59
Mean age	40.03	38.91
Years of Service	0-26	0-35
Mean years of service	12.1	11.07

Instrument

The test measure administered prior to, and post to the in-service training was the Hearing Health Inventory.

Hearing Health Inventory

The Hearing Health Inventory (Singer & Brownell, 1984) was designed to assess hearing health knowledge of the adult population (see Appendix A). The Hearing Health Inventory (HHI) consists of two sections. Section 1 consists of eight items requesting demographic and personal information. Section 2 consists of 35 statements designed to evaluate knowledge of hearing and health. Statements are either correct or incorrect as worded. Subjects are asked to read the statement and respond with either "agree," "disagree," or "undecided."

The 35 statements are clustered into three subscores. Ten items sample knowledge about hearing aids, ten items sample knowledge about the effect of drugs and disease on hearing, and fifteen items sample general knowledge about hearing loss. These subscores are titled Hearing, Drugs/Disease, and General respectively.

The first 34 items were used in a split-half reliability test and produced a coefficient of .88, which indicates a respectable level of reliability for use in this design.

Data Collection

Prior to conducting this study, permission was obtained from (a) the members of the ethics review board for each hospital and (b) professionals participating in the study (see Appendix B). Once permission was received, a Subject Data Form (see Appendix C) was completed by each participant. Confidentiality was assured by giving each participant and setting identification numbers versus using the participant's name and setting on the Subject Data Form. The participants were asked to complete a pretest and posttest requiring twenty minutes for each test session and to attend a twenty five minute in-service presentation. The first session involved the pretest and the in-service. After a ten day period the participants completed Part 2 of the Hearing Health Inventory as a means of assessing the effectiveness of in-servicing on this topic. An outline of the in-service presentation is included (see Appendix D).

Experimental Treatment

The experimental treatment involved a 25 minute in-service training session. The in-service presentation was developed by the researcher to examine particular topics related to hearing loss, its causes, and effects. The in-service was aimed at addressing the same topics appearing in the instrument. An outline of the in-service presentation is included (see Appendix D). The prepared in-service was presented

each time using overhead transparencies and relevant information was presented with the overheads accordingly. A list of transparencies is included (see Appendix D).

The in-service session was presented by the researcher on six separate occasions, three times at an active treatment facility, one time at one extended care facility, and two times at another extended care facility. This study was conducted at the convenience of the health professionals and at a time most suitable for hospital scheduling of these participants. The in-service was attended on a volunteer basis by all subjects.

Data Analysis

The StatView II computer program, designed for the Macintosh computer, was used to analyse the data for the study. An one-way analysis of variance was used to determine whether a significant difference existed between groups and within groups for pretest scores for hearing health knowledge. A two factor repeated measure analysis of variance was used to determine if there was an increase in the health professionals' knowledge after receiving an in-service training session on hearing impairments.

The variables of age and years of experience were examined using a one factor analysis of variance. A two factor analysis of variance was used to determine if there was an increase in the health professionals' knowledge for each subsection on the HHI after receiving an in-service training session on hearing impairments. A correlation matrix was calculated to determine relationships between pretest scores, posttest scores and the demographic variables. Results exceeding or at the .05 level were considered statistically significant. The following chapter contains the results of data analysis.

CHAPTER FOUR
RESULTS

The data are presented and interpreted in two main sections corresponding to the two hypotheses derived from the review of relevant literature presented in Chapter two. Data were gathered and results tallied for each hypothesis. Statistical tests were performed to determine if any numerical differences could be regarded as statistically significant. Each hypothesis is restated, results are offered in tabular form, and conclusions are drawn regarding the acceptance or rejection of each contention. Included is an auxiliary analysis section providing findings regarding the variables of age, occupation, years of service, prior education on this topic, and experience with deaf and hard of hearing individuals. These auxiliary calculations also rule out counter explanations for the findings.

Hypothesis I

Professionals working in an extended care facility (Group II) will be more informed about hearing loss than professionals working in an active treatment hospital (Group I).

Results

Scores for hearing health knowledge were based on raw scores obtained from the HHI. Scores ranged from 9 to 30 out of a possible range of 0 to 35. Ranges, means and standard deviations for group results on the HHI are shown in Table 4.

TABLE 4

Ranges, Means, and Standard Deviations (SD) of Hearing Health Inventory Scores (Pre-test)

Group	N	Range*	Mean	SD
1	30	9-30	23.3	3.29
2	34	14-31	22.38	3.57

* Raw scores out of a possible range of 0-35.

A one-way analysis of variance was performed to determine whether there was a significant difference between the two groups for hearing health knowledge. Results are provided in Table 5.

TABLE 5

Analysis of Variance of Hearing Health Knowledge (HHI)

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between group	1	13.421	13.421	.598	.4421
Within group	62	1390.329	22.425		
Total	63	1403.75			

Conclusions

As may be seen from Table 4, the mean score on the HHI was higher for Group I than for Group II. To find out if this observed difference, was in fact significant, a one-way analysis of variance was performed. No significant difference was found. The probability is .4421 which does not exceed the criteria level of .05 stated in the research proposal. Hypothesis I was rejected. Professionals working in an extended care facility (Group II) were not more informed about hearing loss than professionals working in an active treatment hospital. (Group I).

Hypothesis II.

Health professionals' knowledge of hearing impairments will be increased by exposure to an in-service training session.

Results

Scores for hearing health knowledge were based on raw scores obtained from the HHI. Scores for Group I (Active Treatment) ranged from 9 to 30 for Pre-knowledge and from 20-33 for Post-knowledge out of a possible range of 0 to 35. Scores for Group II (Extended Care) ranged from 14 to 31 for Pre-knowledge and from 14-33 for Post-knowledge out of a possible range of 0 to 35 . Ranges, means, and standard deviations for group results on the HHI are shown in Table 6.

TABLE 6

Pretest and Posttest Ranges, Means, and Standard Deviations (SD) for the Health Professionals (64) on the Hearing Health Inventory

	Variable	
Group I (Active Treatment)	Pre-knowledge	Post-knowledge
N	30	30
Range*	9-30	20-33
Mean	23.3	28.31
Standard Deviation	5.1	3.515
Standard Error	0.931	0.64

*** Raw scores out of a possible range of 0-35**

	Variable	
Group II (Extended Care)	Pre-knowledge	Post-knowledge
N	34	34
Range*	14-31	14-33
Mean	22.382	25.882
Standard Deviation	4.39	4.904
Standard Error	.753	.841

* Raw scores out of a possible range of 0-35

A two-factor repeated measures analysis of variance was employed to determine whether there was a significant difference between pre-knowledge and post-knowledge for the two groups of health professionals after exposure to an in-service training session. Results are provided in TABLE 7.

TABLE 7

Two-Factor Repeated Measure Analysis of Variance-Overall Knowledge by Setting

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Group (I)	1	88.646	88.646	2.526	.1171
SubjectsW. Groups	62	2175.909	35.095		
Repeated Measure(II)	1	565.32	565.32	95.699	.0001
(I and II)	1	17.93	17.93	3.035	.0864
(II) xSubjects W. Groups	62	366.25	5.907		

Conclusions

As shown on Table 6, the means for pre-knowledge and post-knowledge for Group I and Group II appear different. An analysis of variance was performed to test for any significant difference. The actual probability for repeated measures is .0001 which exceeds the criteria level of .05 stated in the research proposal. Hypothesis II must be accepted. Health professionals' knowledge of hearing impairments was found to increase after being exposed to an in-service training session.

Other Variables

Age

Health professionals in this study ranged in age from 20 to 59 years of age. Ranges, means, and standard deviations of ages for each group are shown in Table 8.

TABLE 8

Ranges, Means, and Standard Deviations of Age

Group	N	Range*	Mean*	SD	S.Error
I	30	20 to 57	40.033	9.05	1.652
II	34	20 to 59	38.912	11.291	1.936

*** Age in years**

An analysis of variance was employed to determine whether there was a significant difference between the ages for Group I and Group II. Results are provided in Table 9.

TABLE 9

Analysis of Variance for Age

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	1	20.048	20.048	.189	.6654
Within groups	62	6581.702	106.156		
Total	63	6601.75			

Information provided in Table 8 suggested a difference in means. Although the mean age appeared higher for Group I, an analysis of variance (Table 9) indicated no statistically significant difference in age between the two groups of professionals.

Years of Service

Years of service for the health professionals in this study ranged from 0 to 35 years. Ranges, means, and standard deviations of years of service for each group are shown in Table 10.

TABLE 10

Ranges, Means, and Standard Deviations of Years of Service

Group	N	Range*	Mean*	SD	S.Error
I	30	0 to 26	12.1	9.355	1.708
II	34	0 to 35	11.074	9.915	1.577

* service in years

An analysis of variance was employed to determine whether there was a significant difference between the years of service for Group I and Group II. Results are provided in TABLE 11.

TABLE 11

Analysis of Variance for Years of Service

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	1	16.792	16.792	.195	.66
Within groups	62	5327.766	85.932		
Total	63	5344.559			

Information provided in Table 10 suggests a disparity in means. However, even though the mean years of service appears higher for Group I, an analysis of variance (Table 11) indicated that no significant difference in years of service existed between the two groups of professionals.

Subscores by Setting (Active Treatment and Extended Care)

Subscore for Hearing Section of HHI

Results

Scores for hearing aid knowledge were based on raw scores obtained from the Hearing Section of the HHI. Scores for Group I (Active Treatment) ranged from 3 to 10 for Pre-knowledge and from 4-10 for Post-knowledge out of a possible range of 0 to 10 . Scores for Group II (Extended Care) ranged from 1-9 for Pre-knowledge and from 2-10 for Post-knowledge out of a possible range of 0 to 10. Ranges, means, and standard deviations for group results on the HHI are shown in Table 12

TABLE 12

Pretest and Posttest Ranges, Means, and Standard Deviations (SD) for the Health Professionals (64) on the Hearing Section of the (HHI)

	Variable	
Group I (Active Treatment)	Pre-knowledge	Post-knowledge
N	30	30
Range*	3-10	4-10
Mean	6.8	6.967
Standard Deviation	1.75	1.377

* Raw scores out of a possible range of 0-35

	Variable	
Group II (Extended Care)	Pre-knowledge	Post-knowledge
N	34	34
Range*	1-9	2-10
Mean	5.824	6.441
Standard Deviation	2.11	2.063

* Raw scores out of a possible range of 0-10

A two-factor repeated measures, analysis of variance was employed to determine whether there was a significant difference between pre-knowledge and

post-knowledge on the Hearing Section of the HHI for the two groups of health professionals after exposure to an in-service training session. Results are provided in TABLE 13.

TABLE 13

Two-Factor Repeated Measure Analysis of Variance- Hearing Subscore by Setting

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Group (I)	1	17.977	17.97	72.933	.0918
Subjects W. Groups	62	379.992	6.129		
Repeated Measure (II)	1	5.281	5.281	6.408	.0139
(I and II)	1	1.621	1.621	1.966	.1658
(II) x Subjects W. Groups	62	51.098	.824		

Conclusions

As shown on Table 12, the means for pre-knowledge and post-knowledge for Group I and Group II appear different for the Hearing Section of the HHI. An analysis of variance was performed to test for any significant difference. The actual probability for repeated measures is .0139 which exceeds the criteria level of .05 stated in the research proposal. Therefore, health professionals' knowledge of hearing aids did increase after being exposed to an in-service training session.

Subscore for Drug/ Disease Section of HHI

Results

Scores for drug and disease knowledge were based on raw scores obtained from the Drug/Disease Section of the HHI. Scores for Group I (Active Treatment) ranged from 0-9 for Pre-knowledge and from 2-10 for Post-knowledge out of a possible range of 0 to 10. Scores for Group II (Extended Care) ranged from 0-10 for Pre-knowledge and from 4-10 for Post-knowledge out of a possible range of 0 to 10. Ranges, means, and standard deviations for group results on the HHI are shown in Table 14.

TABLE 14

Pretest and Posttest Ranges, Means, and Standard Deviations (SD) for the Health Professionals (64) on the Drugs/Disease Section of the (HHI)

	Variable	
Group I (Active Treatment)	Pre-knowledge	Post-knowledge
N	30	30
Range*	0-9	2-10
Mean	5.5	8.7
Standard Deviation	2.403	1.685

* Raw scores out of a possible range of 0-10

	Variable	
Group II (Extended Care)	Pre-knowledge	Post-knowledge
N	34	34
Range*	0-10	4-10
Mean	5.853	7.882
Standard Deviation	1.811	1.903

* Raw scores out of a possible range of 0-10

A two-factor repeated measures analysis of variance was employed to determine whether there was a significant difference between pre-knowledge and post-

post-knowledge on the Drugs/Disease Section of the HHI for the two groups of health professionals after exposure to an in-service training session. Results are provided in TABLE 15.

TABLE 15

Two-Factor Repeated Measure Analysis of Variance-

Drug/Disease Subscore by Setting

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Group (I)	1	1.721	1.721	.294	.5895
SubjectsW. Groups	62	362.709	5.85		
Repeated Measure(II)	1	212.695	212.695	114.785	.0001
(I and II)	1	10.919	10.919	5.893	.0181
(II) x Subjects W. Groups	62	114.885	1.853		

Conclusions

As shown on Table 14, the means for pre-knowledge and post-knowledge for Group I and Group II appear different for the Drug/Disease Section of the HHI. An analysis of variance was performed to test for any significant difference. The actual probability for repeated measures is .0001 which exceeds the criteria level of .05 stated in the research proposal. Also, there was a marked increase in means for post-knowledge for both groups after the in-service for the drug/disease section of the

inventory. Health professionals' knowledge of drugs and disease related to hearing loss was found to increase after being exposed to an in-service training session.

Subscore for General Section of HHI

Results

Scores for general knowledge were based on raw scores obtained from the General Section of the HHI. Scores for Group I (Active Treatment) ranged from 5-14 for Pre-knowledge and from 8-15 for Post-knowledge out of a possible range of 0 to 15. Scores for Group II (Extended Care) ranged from 6-15 for Pre-knowledge and from 6-15 for Post-knowledge out of a possible range of 0 to 15 . Ranges, means and standard deviations for group results on the HHI are shown in Table 16.

TABLE 16

Pretest and Posttest Ranges, Means, and Standard Deviations (SD) for the Health Professionals (64) on the General Section of the (HHI)

	Variable	
Group I (Active Treatment)	Pre-knowledge	Post-knowledge
N	30	30
Range*	5-14	8-15
Mean	10.97	12.43
Standard Deviation	1.46	1.46

* Raw scores out of a possible range of 0-10

	Variable	
Group II (Extended Care)	Pre-knowledge	Post-knowledge
N	34	34
Range*	6-15	6-15
Mean	11.14	11.61
Standard Deviation	22.14	22.14

* Raw scores out of a possible range of 0-15

A two-factor repeated measures analysis of variance was employed to determine whether there was a significant difference between pre-knowledge and

post-knowledge on the General Section of the HHI for the two groups of health professionals after exposure to an in-service training session. Results are provided in TABLE 17

TABLE 17

Two-Factor Repeated Measure Analysis of Variance–General Subscore by Setting

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Group (I)	1	5.691	5.691	.829	.3662
Subjects W. Groups	62	425.801	6.868		
Repeated Measure(II)	1	33.008	33.008	16.429	.0001
(I and II)	1	4.927	4.927	2.452	.1225
(II) xSubjects W. Groups	62	124.566	2.009		

Conclusions

As shown on Table 16, the means for pre-knowledge and post-knowledge for Group I and Group II appear different for the General Section of the HHI. An analysis of variance was performed to test for any significant difference. The actual probability for repeated measures is .0001 which exceeds the criteria level of .05 stated in the research proposal. Health professionals' knowledge of general information related to hearing loss did increase after being exposed to an in-service training session.

Summary of Findings

To review the hypotheses...

I. Professionals working in an extended care facility (Group II) will be more informed about hearing loss than professionals working in an active treatment hospital. (Group I).

II. Health professionals' knowledge of hearing impairments will be increased by exposure to an in-service training session.

Hypothesis I was rejected. It was determined that this sample of health professionals working in an extended care facility (Group II) were not more informed about hearing loss than this sample of health professionals working in an active treatment hospital (Group I).

Hypothesis II was confirmed. It was determined that health professionals did increase their knowledge of hearing impairments after being exposed to an in-service training session.

These hypotheses, findings and relationships are further discussed in Chapter V.

CHAPTER FIVE
DISCUSSION

The present research was guided by two aims. One aim was to assess the extent of health professionals' knowledge of hearing loss in two different settings, active treatment and extended care. The second aim was to evaluate the effect an in-service training session on hearing impairments would have on increasing knowledge and awareness of hearing loss. The results of the research indicate that provision of an in-service session on the the topic of hearing loss is an effective way of increasing professionals' knowledge of hearing impairments. This chapter begins with a discussion of the results of each hypotheses. Second, implications for practice are discussed. The chapter concludes with a section on implications for further research.

Summary of Results and Discussion

Sixty four health professionals from two different settings in a western Canadian province were participants in this study. These professionals volunteered their time to complete a pretest and posttest and in-service session during their daily schedule at work. Their interest in professional development in this area was encouraging and demonstrates an interest in the area of hearing impairments.

Hypothesis I

To test Hypothesis I, an experiment was designed to compare knowledge of hearing loss of two groups of professionals, working in two different hospital contexts. Results of the analysis revealed no significant difference at the .05 criteria level , set at the proposal stage of this research. Research has shown that 96% of geriatric residents in extended care settings exhibit hearing loss of some degree (Schow & Nerbonne, 1980; Sommers et al.,1982). Although more hearing impaired individuals are patients in extended care settings than in active care settings, this study indicated

no difference in professionals' awareness of communication difficulties and unique problems experienced by individuals with hearing loss.

Hypothesis II

Hypothesis II was derived from the literature review. To test Hypothesis II an experiment was designed to compare the pre-knowledge and post-knowledge of health professionals having received an in-service training session on hearing impairments. Analysis of the data shows a significant increase in all areas of knowledge related to hearing loss following an in-service on this topic. This finding concurs with a study conducted by Singer & Brownell (1984) who found that subjects where able to gain information about hearing loss when time was devoted to informing them of hearing health and preventative self-care skills related to hearing.

A significant difference was found between pre knowledge and post knowledge for the subsection on hearing aid information. This increase in information could be beneficial in helping implement auditory rehabilitation programs for patients experiencing hearing loss. Researchers have examined and developed programs focusing on auditory rehabilitation (Smith & Faye, 1977; Peberdy et al., 1984; Cleaver, 1987). A significant increase in knowledge for the subsection on drugs and diseases relating to hearing loss was found after the in-service session. This increase in knowledge could be beneficial in preventative medicine procedures and when dealing with patients experiencing the effects of a hearing loss. A significant difference was also found between pre knowledge and post knowledge for the general information subsection of the inventory. This increase in knowledge could be beneficial in understanding the psychological and social impact of hearing loss. Also it could increase awareness and coping skills when dealing with communication difficulties between health professionals and patients due to hearing difficulties. A goal of the in-service session was to increase understanding of the interference with effective communication resulting from hearing loss. Sensitivity to communication difficulty can

decrease patient anxiety, promote speed and accuracy of diagnosis, and strengthen the effectiveness of rehabilitation (Zegeer, 1986).

Age and Years of Service

Analysis of both of these variables indicated that no significant difference between the two groups of professionals existed. This finding suggests that age and years of service did not significantly influence the increase in knowledge following a in-service session on hearing impairments.

Implications for Practice

Results obtained from this study have implications for health professionals. Test scores helped assess the extent of hearing health knowledge and determine areas of need for future education purposes. Results from this study provide a rationale for in-servicing as a means of extending knowledge in this area. An in-service was designed to heighten awareness of general knowledge related to hearing impairments, and to help health professionals develop effective communication techniques when interacting with deaf and hard of hearing individuals. Information about self care skills regarding hearing health could be beneficial to health professional and the patients they serve.

Demographers predict an increase of approximately five present in the aging population over the next thirty years (Kline, Sekuler, & Dismukes, 1982; Roadberg, 1985). Subsequently, because the aging population experiences a high percentage of acquired hearing loss, an increase in the hard of hearing population will be apparent in all medical facilities particularly in extended care facilities. It is likely that health professionals will encounter deaf and hard of hearing individuals in the workplace. There was an awareness of this presence, as the health professionals used as subjects in this study reported prior experience in working with members of the hearing impaired population. Health professionals from the active treatment facility responded (27/30) and health professionals from the extended care facility responded

(30/34) that they had prior experience with deaf and hard of hearing persons. This noted awareness of prevalence of hearing loss and willingness to participate in this research indicates a need for provision of future education on this topic.

In-service sessions on the topic of hearing loss should provide information in several related areas. Areas of concentrations identified from this research and relative literature include; etiology of hearing loss, amplification technology, psychological and social impact of hearing loss, and strategies to promote effective communication. The etiology of hearing loss should be addressed with reference to drugs and diseases that have the potential of affecting hearing. Awareness of amplification technology is essential in helping with care for basic personal auditory equipment and in implementing auditory rehabilitation programs. The primary goal of an in-service session should be increasing awareness of the lived experience of the deaf or hard of hearing person and assisting health professionals in increasing awareness of effective strategies for dealing with communication breakdowns.

Implications for Further Research

The present study represents only one sector of health professionals, namely those working in the public sector. Findings cannot be generalized to all health professionals. Professional continuing education programs could be designed to access health professionals in the public and private sectors. Access to clients with a formal program may not be feasible, however informed health professionals could integrate hearing loss information into routine contact with patients.

A possible focus for future research is the development of an inventory specifically designed to assess strategies for dealing with communication difficulties in a hospital setting. Such an instrument might enable development of an in-service focusing directly on dealing with communication breakdown.

Development of a hearing health booklet, covering hearing care techniques could aid in preventative techniques in conserving hearing for health professionals and their clients. Another beneficial undertaking would be the designing of an information booklet for hospital staff and patients providing information on all hearing services available in the area.

An in-service designed for individual facilities for helping professionals provide orientation to the hospital for deaf and hard of hearing patients would serve to decrease patient anxiety and improve effectiveness of rehabilitation. Development of a picture sign language booklet to be given to deaf patients on admission to the institution would also be beneficial for both health professionals and patients.

Providing knowledge of the impact of hearing loss on individuals lives, particularly those in hospital settings, was a goal of the in-service designed for this study. This research has shown that time devoted to education of professionals is a realistic way of achieving this goal.

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APPENDIX A

Sample Copy of the Instrument

Hearing Health Inventory (HHI)

1. What is your age? _____
2. What is your sex? Male _____ Female _____
3. Circle the highest level of education you have completed.

   Secondary 9 10 11 12

   College

   Graduate School
4. What is your present health care arrangement? (Check one)

   _____ I visit my private physician(s)

   _____ I belong to a Group Health Association

   _____ I use health services of a hospital emergency room
5. When was the last time you had your hearing tested? (Check one)

   _____ Within the past year

   _____ Within the past five years

   _____ Within the past ten years

   _____ Over ten years ago

   _____ Never had my hearing tested
6. Who tested your hearing? (Check one)

   _____ Physician

   _____ Audiologist

   _____ Nurse

   _____ Hearing aid dealer

   _____Other (Please specify) _____

7. When you had your last hearing test, what were you told by the health professional who tested you?

(Please check both ears)

Left ear		Right ear	
Normal hearing	_____	Normal hearing	_____
Some loss	_____	Some loss	_____
Don't remember	_____	Don't remember	_____
Never had a test	_____	Never had a test	_____

8. Why did you have your hearing tested? (Check all that apply)

_____ Doctor recommended test

_____ Other health professional recommended test

_____ Family or friend recommended test

_____ Test required by school or college

_____ Test required or recommended by employer

_____ Test required for military examination

_____ I suspected I had a hearing problem

_____ Other (Please specify)

Part 2.

This section was designed to evaluate your knowledge of hearing and health. Read each of the following statements carefully. If you agree with the statement, check the box marked "agree"; If you are unsure or undecided, check the box marked "undecided"; If you disagree, check the box marked "disagree".

		Agree	Undecided	Disagree
9.	The aging process has minimal effect on hearing for most people.	_____	_____	_____
10.	A good hearing aid can dramatically improve one's ability to understand speech.	_____	_____	_____
11.	Aspirin may produce a temporary change in your ability to hear.	_____	_____	_____
12.	Flying in an airplane or scuba diving can affect your ability to hear.	_____	_____	_____
13.	Repeated use of Valium can reduce your ability to hear.	_____	_____	_____
14.	Bacterial infections such as streptococcus, staphlococcus,and pnemonococcus can reduce your ability to hear.	_____	_____	_____
15.	Prolonged exposure to loud noise can reduce your ability to hear.	_____	_____	_____
16.	It is easier to understand speech if you see the speaker's face.	_____	_____	_____
17.	Since you have two ears, you really need two hearing aids when you have a hearing loss.	_____	_____	_____
18.	The more expensive the hearing aid, the more beneficial it will be to the wearer.	_____	_____	_____
19.	Diabetes can produce hearing loss.	_____	_____	_____
20.	If you have a hearing loss and do not get a hearing aid,your hearing will get worse.	_____	_____	_____

21. People can be trained to lipread well enough to compensate any hearing loss. _____ _____ _____
22. Antacids can produce a hearing loss. _____ _____ _____
23. If you talk to someone who is wearing a hearing aid, it is important to speak very loudly, so he/she can understand more clearly. _____ _____ _____
24. If you talk to someone with a hearing loss who is not wearing a hearing aid, It is important to speak very loudly so he/ she can understand more clearly. _____ _____ _____
25. Your hearing may improve if you lose your sight. _____ _____ _____
26. If a person has one good ear and one bad ear, the bad ear may get worse because the good ear is doing most of the work. _____ _____ _____
27. Noise will not affect your hearing if you can ignore or get accustomed to it. _____ _____ _____
28. If you are talking to an older adult with a hearing loss,speak directly into the person's ear to be understood clearly. _____ _____ _____
29. Hearing loss can have a negative psychological impact on an individual. _____ _____ _____
30. Hearing loss can retard your educational progress. _____ _____ _____
31. Hearing tests are likely to be physically painful. _____ _____ _____

32.	It is common for older people with hearing loss to have more difficulty understanding the speech of women and children.	____	____	____
33.	All types of hearing loss can be helped by hearing aids.	____	____	____
34.	Foreign substances such as hair spray and hair dye in the ear canal increase the chance of infection.	____	____	____
35.	A blow or slap to the ear can damage your eardrum.	____	____	____
36.	Influenza, chicken pox, and mononucleosis may produce sudden hearing loss.	____	____	____
37.	Streptomycin, neomycin, and some other antibiotics may reduce ability to hear.	____	____	____
38.	There is probably more risk than benefit to using a cotton swab in the ear.	____	____	____
39.	Cotton in the ears will effectively reduce the intensity of loud noise.	____	____	____
40.	Most hearing problems experienced by adults can be resolved by medication or surgery.	____	____	____
41.	Ringing in the ears is primarily a psychological phenomenon.	____	____	____
42.	The ability to hear is essential to learn how to speak.	____	____	____

43. There is little to be gained by testing the hearing of individuals younger than five or older than 65 years of age. _____ _____ _____

*#3. Elementary 012345678 will be omitted.

** #4. Health services of my employer and Other (Please specify) will be omitted.

APPENDIX B

Participation Form

Dear Participant:

I am a Masters student in Educational Psychology at the University of Alberta and am conducting a study to examine the extent of hearing health knowledge and determine areas of need regarding inservicing of health professionals on the topic of hearing health. I am interested in the present knowledge of health professionals in the area of hearing and hope to provide beneficial information regarding hearing loss, communication techniques, and self care skills related to hearing health.

As part of the study, an inventory will be administered in a group setting, followed by a brief inservice on hearing health. This session will take approximately one hour to complete. If you decide to participate, you will be asked to complete Part 2 of the Hearing Health Inventory again in ten days, as a means of assessing the effectiveness of inservicing on this topic. This research is being co-supervised by Dr. Ceinwen Cumming and Dr. Gene Fox, Faculty of Education, University of Alberta.

If you agree to participate in the research study please sign and return the permission form below.

Sincerely, Lynn Butler.

==========

I agree to participate in the research study as outlined above.

Name:(print)_____

Signature:_____

APPENDIX C

Subject Data Form

Subject Data Form

Identification Number _____

Hospital Setting _____

Occupation _____

Years of Service _____

Birthdate_____

Have you ever known any hard of hearing person(s)?_____

If yes please indicate how many?_____

Have you ever had a course that included a discussion of hearing and/or hearing disorders?_____

If yes, what was the name of the course? _____

APPENDIX D

In-service Presentation

Agenda for In-service

Introduction

Hearing Loss-Definition

Etiology of the Human Ear

Types and Causes of Hearing Loss

Effects of Common Diseases and Medication on Hearing

Preventative Self Care Skills

Interpretation of the Audiogram

Degrees of Hearing Loss

Technical Aids and Specialized Equipment

Acquired Hearing Impairment in the Adult

Effects of Hearing Loss

Effective Communication Strategies

Resource Information

In-service Overhead Transparencies

Agenda for in-service

Terminology of in-service

Types and causes of hearing loss

Effects of common diseases and medication on hearing

Preventative self care skills

Interpretation of the audiogram

Degrees of hearing loss

Technical aids and specialized equipment

Acquired hearing impairment in the adult

Hard of hearing..... What does it mean?

Effects of hearing loss

Effective communication strategies

Resource information